

UČNI NAČRT PREDMETA / COURSE SYLLABUS (leto / year 2017/18)						
Predmet:		Računalništvo 1				
Course title:		Computer science 1				
Študijski program in stopnja Study programme and level		Študijska smer Study field		Letnik Academic year	Semester Semester	
Visokošolski strokovni študijski program Praktična matematika		ni smeri		3	prvi	
First cycle professional study programme Practical Mathematics		none		3	first	
Vrsta predmeta / Course type				obvezni / compulsory		
Univerzitetna koda predmeta / University course code:				M0430		
Predavanja Lectures	Seminar Seminar	Vaje Tutorial	Klinične vaje work	Druge oblike študija	Samost. delo Individ. work	ECTS
30	15	45			120	7
Nosilec predmeta / Lecturer:		prof. dr. Sergio Cabello Justo, viš. pred. mag. Matija Lokar, prof. dr. Marko Petkovšek				
Jeziki / Languages:		Predavanja / Lectures:		slovenski / Slovene		
		Vaje / Tutorial:		slovenski / Slovene		
Pogoji za vključitev v delo oz. za opravljanje študijskih obveznosti:				Prerequisites:		
Vpis v letnik študija.				Enrolment in the programme.		
Opravljen predmet Programiranje 2.				Completed course Programming 2.		
Vsebina:				Content (Syllabus outline):		

<p>Osnove analize algoritmov. Osnovne podatkovne strukture. Sklad, vrsta, seznam, verižni seznam. Drevesa, grafi. Osnovne metode načrtovanja algoritmov s primeri. Deli in vladaj. Požrešna metoda. Dinamično programiranje.</p>	<p>The basics of algorithm analysis Basic data structures. Stack, queue, linked list. Trees, graphs. Basic methods of algorithms development with examples. Divide and conquer. Greedy method. Dynamic programming.</p>
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Temeljni literatura in viri / Readings:

<p>T. H. Cormen, C. E. Leiserson, R. L. Rivest, C. Stein: Introduction to Algorithms, 2. izdaja, MIT Press, Cambridge, 2001.</p> <p>I. Kononenko, M. Robnik Šikonja: Algoritmi in podatkovne strukture I, 1. izdaja, Fakulteta za računalništvo in informatiko, Ljubljana, 2003.</p> <p>I. Kononenko, M. Robnik Šikonja: Algoritmi in podatkovne strukture II, 1. izdaja, Fakulteta za računalništvo in informatiko, Ljubljana, 2004.</p> <p>J. Kozak: Podatkovne strukture in algoritmi, DMFA založništvo, Ljubljana, 1997.</p> <p>Spletne strani in tečaji (Coursera, Udacity, Edx ...) s tega področja, izbor je vsakoletno osvežen na spletni strani predmeta.</p> <p>Zapiski s predavanj, gradivo za vaje in ostalo gradivo v spletni učilnici predmeta.</p> <p>Web sites and courses (Coursera, Udacity, Edx...), selection is annually refreshed on the Web site of the subject.</p> <p>Notes from lectures, tutorials and other resources in the online classroom.</p>
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Cilji in kompetence:

<p>Študenti bodo spoznali osnovne podatkovne strukture in z njimi povezane algoritme, ki se uporabljajo pri programiranju. Nove podatkovne strukture in algoritme bodo znali uporabiti pri reševanju matematičnih problemov in problemov iz realnega življenja, kjer se da pomagati z računalnikom.</p>

Objectives and competences:

<p>Students will learn the basic data structures and related algorithms. They will be able to use newly learnt data structures and algorithms solving mathematical problems and problems in real life.</p>
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Predvideni študijski rezultati:

Intended learning outcomes:

Znanje in razumevanje: Študent spozna nekatere osnove podatkovnih struktur in algoritmov ter praktičnih problemov, pri katerih se jih lahko smiselno uporabi.

Uporaba:

Študent razvije sposobnost snovanja učinkovitih računalniških programov in sposobnost napovedovanja njihovega obnašanja.

Refleksija:

Študent razvije sposobnost povezovanja teoretičnih in praktičnih postopkov pri razvoju algoritmov

Prenosljive spretnosti – niso vezane le na en predmet:

Predmet se povezuje s predmetom Računalništvo 2.

Knowledge and understanding:

The student learns some of the fundamentals of data structures and algorithms, as well as practical problems where they can be applied.

Application:

The student develops the ability to design effective computer programs and the ability to predict their behavior.

Reflection:

The student develops the ability of integration of theoretical and practical procedures in the development of algorithms.

Transferable skills:

The subject is connected with Computing Science 2.

Metode poučevanja in učenja:

predavanja, vaje, domače naloge, konzultacije

Learning and teaching methods:

Lectures, exercises, homeworks, consultations

Načini ocenjevanja:

Delež (v %) /

Weight (in %)

Assessment:

Način (pisni izpit, ustno izpraševanje, naloge, sem. naloga):

50%

Type (examination, oral, coursework, project):

domače naloge (pogoj za pristop k pisnemu izpitu)

50%

home works (requirement for taking the written exam)

izpit iz vaj (kolokviji ali pisni izpit)

midterm exams instead of written exam, written exam

<p>seminarska naloga</p> <p>ustni izpit – zagovor seminarske naloge</p> <p>Študentje dobijo dve oceni:</p> <p>eno iz izpita iz vaj ter domačih nalog,</p> <p>drugo iz seminarske naloge in ustnega izpita.</p> <p>Ocene: 1-5 (negativno), 6-10 (pozitivno) (po Statutu UL)</p>		<p>oral exam – the presentation of term paper</p> <p>Students receive two grades: one from the written exam and home works and the other from the oral exam.</p> <p>Grading: 1-5 (fail), 6-10 (pass) (according to the Statute of UL)</p>
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Reference nosilca / Lecturer's references:

Sergio Cabello:
CABELLO, Sergio, CHAMBERS, Erin W., ERICKSON, Jeff. Multiple-source shortest paths in embedded graphs. SIAM journal on computing, ISSN 0097-5397, 2013, vol. 42, no. 4, str. 1542-1571. [COBISS.SI-ID 16668761]

CABELLO, Sergio. Many distances in planar graphs. Algorithmica, ISSN 0178-4617, 2012, vol. 62, no. 1-2, str. 361-381. [COBISS.SI-ID 15702873]

Sergio Cabello:
BERG, Mark de, CABELLO, Sergio, HAR-PELED, Sariel. Covering many or few points with unit disks. Theory of computing systems, ISSN 1432-4350, 2009, vol. 45, no. 3, str. 446-469. [COBISS.SI-ID 14900825]

Matija Lokar:
MARKOVIČ, Katja. Izdelava vodičev za uporabo programa GeoGebra : diplomska naloga. Ljubljana: [K. Markovič], 2011. 73 f., ilustr. [COBISS.SI-ID 16189529]

LOKAR, Matija. Designing tasks for CAS/DGS classrooms. V: TIME 2010, Technology and its Integration into Mathematics Education, July 6th-10th, 2010, Málaga, Spain. Proceedings of TIME 2010 : Technology and its Integration into Mathematics Education. Málaga: Universidad de Málaga, 2011, 17 str. [COBISS.SI-ID 15643993]

LOKAR, Matija. Some issues on designing tasks for CAS classrooms. V: 6th Came symposium: structured abstracts : 16-17 July 2009, Megatrend University, Belgrade, Serbia. Beograd: Megatrend University, 2009, str. 15-16. [COBISS.SI-ID 15241817]

KUDREVIČIUS, Evelina. Platforma SharePoint in oblikovanje glavne strani : diplomska naloga. Ljubljana: [E. Kudrevičius], 2008. 77 f., ilustr. [COBISS.SI-ID 15105625]

LOKAR, Matija. Prvenstvo študentskih ekip Univerze v Ljubljani v programiranju 2002. Ljubljana: [Fakulteta za matematiko in fiziko], 2002. 100 str., ilustr. [COBISS.SI-ID 12122457]

Marko Petkovšek:

PETKOVŠEK, Marko. Hypergeometric solutions of linear difference equations with polynomial coefficients. *Journal of symbolic computation*, ISSN 0747-7171, 1992, let. 14, str. 243-264. [COBISS.SI-ID 8044633]

PETKOVŠEK, Marko. A generalization of Gosper's algorithm. *Discrete Mathematics*, ISSN 0012-365X. [Print ed.], 1994, vol. 134, iss. 1-3, str. 125-131. [COBISS.SI-ID 8048217]

NEMES, István, PETKOVŠEK, Marko. RComp: a Mathematica package for computing with recursive sequences. *Journal of symbolic computation*, ISSN 0747-7171, 1995, let. 20, str. 745-753. [COBISS.SI-ID 6974809]

PETKOVŠEK, Marko, WILF, Herbert S., ZEILBERGER, Doron. *A=B*. Wellesley (Massachusetts): A. K. Peters, cop. 1996. VII, 212 str. ISBN 1-56881-063-6. [COBISS.SI-ID 4085337]